SECTION 23 84 00_HUMIDITY CONTROL EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Steam heated, heat exchanger type humidifiers.
2. Packaged DX dehumidifiers

B. The intent of these standards are to provide input to the design team on the University's preference of manufacturers, design, equipment options and quality assurance to maintain the longevity of its assets.

B. Related Sections:

1. Common Work for HVAC Systems 23 05 00
2. Common Requirements for HVAC Systems 23 05 01
3. Steam and Condensate Valves 23 05 23
4. Identification of HVAC Equipment and Piping 23 05 53
5. Testing and Balancing of HVAC Systems 23 05 93
6. Steam and Condensate Piping Above Grade 23 22 13
7. Steam and Condensate Specialties 23 22 14
8. Air Distribution Systems 23 30 00
9. Air Handling Units 23 73 00

1.2 ENGINEERING AND DESIGN REQUIREMENTS

A. Humidity shall be added to airstreams by steam created by a steam to steam to steam humidifier.

B. Design steam supply pressure to humidifier steam heat exchanger is 15psig.

C. Supply water for dispersion steam shall be of Deionized/Reverse Osmosis (DI/RO) or Distilled Water Quality. Engineering consultant shall determine if there is adequate supply of either DI/RO water or Distilled Water in the building. If there is not adequate supply water capacity present, the consulting engineer shall add a DI/RO water treatment skid as part of the humidifier design.

D. Humidifier shall be designed and located so that all steam condensate is removed via gravity from the dispersion tubes. If there is not adequate fall to remove steam condensate, a condensate pump shall be provided to assist in condensate removal.

E. Consult with Energy and Engineering department if remote or split dehumidification systems are required.

1.3 SUBMITTALS

A. Product Data: Submit catalog sheets indicating general assembly, dimensions, weights, materials, and certified performance ratings duct and service connections, electric nameplate data and wiring diagrams.

B. Manufacturer's Installation Instructions: Submit assembly and setting operations.

C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit instructions for calibrating instruments, lubrication, filter replacement, motor and drive replacement, spare parts lists, wiring diagrams, installation instructions and replacement parts list.

B. Humidity Control Equipment start up report

C. Completed Humidity Control Equipment Data Sheet

D. As Built operating characteristics that are revised to include all changes to air system made during construction.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept units on site in factory packing. Inspect for damage.

1.6 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.7 EXTRA MATERIALS

A. Furnish one set of filter media for evaporative humidifiers.

PART 2 PRODUCTS

2.1 STEAM HEATED HEAT EXCHANGER TYPE HUMIDIFIERS

A. Manufacturers:
1. Dri-Steem Humidifier Company

B. Product Description: Steam heated type isolating heating medium from humidifying medium.

C. Medium: Deionized /Reverse Osmosis Water or Distilled Water depending on what is available in the building.

D. Evaporating Reservoir: Constructed of type 304 stainless steel with welded joints. Gasket sealed cover capable of operating pressures of 19 inches water column. Reservoir cover and access plates shall be removable without the need to dismantle dispersion tubing or fill water piping.

E. Heat Exchanger: Constructed 304 stainless steel tubes and headers with welded joints. Heat exchanger shall be easily removed from the evaporating reservoir.

F. Adjustable Surface Water Flusher: To drain away portion of water upon each refill cycle. Flusher height adjustable for minimal water waste and efficient flushing.

G. Surface Skimmer: Provide surface skimmer to remove solids from humidifier system.

H. Water Fill Valve: Stainless steel body, solenoid operated block style water fill valve with internal strainer factory mounted. Bottom fill system to prevent collapse of steam head during fill cycle. Located to allow minimum water gap of 1-1/2 inches.

I. Dispersion Tubes:
1. Dispersion tubes shall be constructed of 304 stainless steel.
2. Steam hose kit consisting of 2 – 2 inch by 10 foot long hoses, injection tube, support rod, hose clamps, and duct plate.
3. Factory fabricated multiple tube.
4. Dispersion tubes shall be sloped to facilitate removal of condensate

J. Humidifier Controls: Control cabinet shipped loose/factory mounted. Furnish with the following features:
1. Factory wired control valve interlock.
2. Water level control module.
3. Fused control circuit transformer.
4. Numbered terminal block.
5. Main power fuse.
6. Factory mounted, solid state control module for the following functions:
a. Automatic refilling.

b. Low water cutoff.
c. High water cutoff.
d. Surface water flushing.
e. Safety switch interlock functions.
f. Flush mode with automatic drain system.

7. Furnish the following visual indications:
   a. Safety switch interruption.
   b. Power.
   c. Fill.
   d. Heat ready.
   e. Drain.

8. Water level controlled through sensor mounted on reservoir. Control system continues to maintain humidity during fill cycle.

K. Steam Control Valve: Normally closed electric operated modulating control valve.

L. Automatic Temperature Controls: Refer to the Building Automation System Standard for further requirements.

M. Control Components: Furnish humidifier with the following:
1. Electric modulating space humidistat.
2. Electric high limit duct humidistat.
3. Air proving switch.

N. Accessories:
1. Float and thermostatic/Inverted bucket type steam trap.
2. Steam supply strainer.
3. Supports for humidifier heat exchanger.
4. Automatic timed drain system with motor operated drain valve with brass body, factory installed.
5. Automatic seasonal end-of-use drain.
6. Duct plate to seal completely at duct opening.
7. Condensate cooling system to provide cold water mixing of drain water.

2.2 SELF CONTAINED INDOOR DX DEHUMIDIFIERS

A. Manufacturers:
1. Therma-stor Hi-E-Dry

B. Product Description: Self contained dehumidifier with DX refrigeration system, blower fan, internal condensate pump and supply and return duct connections for indoor mounting.

C. Cabinet:

1. Designed for indoor installation.
2. Panels: Constructed of galvanized steel with baked enamel finish. Furnish access doors or removable access panels.
3. Insulation: Factory applied to exposed vertical and horizontal panels 2 inch thick neoprene coated glass fiber with edges protected from erosion.
4. 12” collars for supply and return duct connections.

D. Supply Fan: Forward curved centrifugal type, resiliently mounted with direct drive. PSC motor permanently lubricated with built-in thermal overload protection.

E. Evaporator Coil: Constructed of copper tubes expanded onto aluminum fins. IAQ drain pan with piping connection. Factory leak tested under water.

F. Compressor: Hermetically sealed, resiliently mounted with positive lubrication, and internal motor overload protection. Furnish internal vibration isolators, short cycle protection.

G. Refrigeration circuit: Furnish the following for each circuit thermal expansion valve, filter-drier, suction, discharge, and liquid line service valves with gauge ports, high and low pressure safety controls, and Dehydrate and factory charge each circuit with oil and refrigerant.

H. Condensate Pump: Mounted inside of cabinet, sized to pump condensate through 20’ above the unit, Provide with interlocked safety switch which will switch off dehumidifier if pump fails, 20’ feet of hose

I. Electrical: Supply with grounded power cord.

J. Automatic Temperature Controls: Refer to Section 23 09 00.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify ductwork is ready for installation.

B. Verify piping rough-ins are correct size and at correct location.

C. Verify power wiring is correct voltage and at correct location.

3.2 PREPARATION

A. Contact manufacturer to review installation procedures for field installed accessories.

3.3 INSTALLATION - STEAM HUMIDIFIERS

A. Install in accordance with ARI 630.

B. Install loose equipment furnished by manufacturer.

C. Install galvanized steel rods to support distribution manifolds of steam grid humidifier and mount in air system plenums.

D. Install wall bracket to support humidifier.

E. Make connections to equipment with unions or flanges.

F. Connect steam humidifiers to steam supply and to steam condensate return piping. Install gate valve, inlet strainer, and control valve on steam supply piping. Install strainer, inverted bucket/float and thermostatic steam trap, and gate valve on steam condensate return piping.

G. Connect humidifiers supply to process water piping. Connect drain to drain piping with a condensate cooling (drench) device. Install shutoff valve and strainer on domestic water piping. Install drain piping with trap of depth recommended by manufacturer.

H. Provide control wiring for field installed accessories.

3.4 MANUFACTURER'S FIELD SERVICES

A. Furnish services of factory trained representative for minimum of one day to start equipment according to manufacturer's instructions and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements.

3.5 DEMONSTRATION

A. Furnish services of manufacturer's technical representative for 8 hours to instruct Owner's personnel in operation and maintenance of units. Schedule training with Owner, provide at least 7 days notice to Owner/Construction Manager/Architect/Engineer of training date.

END OF SECTION